Informatics and Surveillance Branch
Incident Management Team
Bluetooth® digitally assisted proximity exposure notification

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SBAR (Notes on Apple Google University of Washington and Microsoft calls 5/5/2020 - 5/9/2020)

• S = Situation (a concise statement of the problem)

Google and Apple are configuring a new solution using Bluetooth® technology to provide proximity contact notification to <u>enhance</u> traditional contact tracing. This does not replace needed infrastructure improvements to support traditional case and contact investigation. However, it provides an opportunity to enhance traditional approaches using new technology and innovation. National partners such as CSTE and states such as California and Oregon hope we can provide a pilot or "Lighthouse" reference implementation model that others can follow. We need to consider potential risks to ensure we do not erode public trust and introduce ethical or privacy concerns. We must also consider impacts to communities from an equity, accessibility, and cultural sensitivity lens—please review Equity Impact Considerations included in the appendix below.

• B = Background (pertinent and brief information related to the situation)

Apple/Google shared their approach (unprecedented collaboration among competitors). They are releasing operating systems (Apple iOS and Android OS) in the coming weeks.

This will enable some features within mobile phones, in a security- and privacy-centric way, where the device stores Rolling Proximity Identifier Keys within a 14-day period (ref www.apple.com/covid19/contacttracing). However, these are just raw functions, not an app or system infrastructure. Users would voluntarily install a regional-specific app. For the app to be successful, Washington would need to create a careful campaign for both pilot testing and then statewide use (assuming a successful pilot).

There are many assumptions about this technology based on similar approaches in other countries (Singapore, South Korea), which were seen as invasive to personal privacy. Those solutions were based on technology that notified everyone in range of the same cell tower (miles), rather than real exposure risk (meters or feet). The solution we are exploring is based on different technology.

This new technology puts privacy and security first. It is specifically designed to protect personal privacy. It requires that states engage with an <u>approved</u> mobile application developer or academic partner. DOH was encouraged to select a single partner to initiate this effort.

The technology uses message keys, exchanged as random gibberish with no ID or GPS, to protect privacy and location. The interface to DOH is only via voluntary phone call to the contact tracer self-report pool.

This approach also requires the presence of a server, preferably at national scale, with information about message keys (random gibberish) that have become positive cases. A regional approach for confirming positive cases prevents people from self-diagnosing and triggering notifications. A PIN provided by the Investigation team or clinical provider (e.g. UW Medicine or Hall Health) is entered by a diagnosed person with consent. The app verifies the PIN as authentic before sending notifications to their potential contacts. As the app is used by others in the community, it regularly scans the central message key server for keys it 'heard' in the past 14 days. If it 'sees' one, the person potentially exposed gets a message on their phone that they have been in proximity to a case and asking them to contact PH. (To understand this in more detail please see diagrams and cartoon of user experience below)

Oregon and California have not yet indicated that they are moving forward with Bluetooth contact tracing technology, and are at various stages of scaling up with technology to support case and contact investigation. In a call with both states we seemed to be the furthest along in our thinking about contact tracing and Bluetooth proximity integration. Neither state has moved ahead with Bluetooth. University of Washington is much more advanced in its understanding of this work (MIT Lincoln Labs may be the nearest 'competitor').

• A = Assessment (analysis and considerations of options — what you found/think)

Research from Oxford shows epidemiological evidence that app-based contact-tracing can suppress the spread of COVID-19 if a high enough proportion of the population uses the app, and that it can still reduce the number of infections if adoption of the app is moderate. In Netherlands[1], app-based contact tracing, even with coverage as low as 20 percent, may be superior to conventional contact tracing. Oxford's [2]findings showed that the willingness to install the app is very high[3]. Available evidence suggests that app-based contact tracing may be a viable approach to enhance containment measures among the general population.

The app on the phone and an administrative environment for jurisdictions to customize messaging, and to dial up or down the proximity alerting sensitivity, has yet to be developed. UW, which has developed the COVIDSafe and StayHome.app (covidsafe.cs.washington.edu) application, seems to be an ideal choice for a mobile application developer to partner with, and has an advanced understanding of this technology. It has explicitly considered the risks involved in any contact tracing system, where any alert to a user could itself give rise to de-anonymizing information. Their approach [UW-Microsoft with Apple and Google] mitigates the security and privacy risks of requiring a trusted third party to know IDs (https://arxiv.org/abs/2004.03544). The notifications are purely anonymous and we can't know who they are unless they voluntarily come forward.

The application will be widely available on smartphones (~2014 and newer). In partnership with UW, we plan to include Apple iOS and Android OS apps in an app store that cannot be installed without consent (see explanation in diagram below). We have made it a requirement to UW that they support non-English proficient speakers with at least 5+ most spoken languages (Spanish, Russian, Vietnamese,

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[1] www.medrxiv.org/content/10.1101/2020.05.09.20096289v1

[2] www.medrxiv.org/content/10.1101/2020.05.05.20091587v1

[3] It is difficult to compare uptake and community participation across nations given the heterogeneity and cultural differences within and across countries.

Ukrainian, and Somali)[4]. The largest disparity in this enhancement may be age, income and geography (rural), not race or language. See equity consideration discussion in appendix.[5]

CSTE, CDC and CDC Foundation funded PHII (Public Health Informatics Institute at the Taskforce for Global Health) have asked informatics representatives from four states (Washington - Bryant Karras, North Dakota - Michelle Dethloff, Michigan - Jim Collins, and Idaho - Kathy Turner) to be on the steering committee, and are standing up a task force to document this effort and how contact tracing can be enhanced through this technology.

We need to make decisions as a nation to determine where a central server housing Bluetooth cryptographically-hashed message keys (de-identified 'random' gibberish) will be hosted. Possibilities include APHL, PHII and others to be determined. CSTE and ASTHO have declined to host this server because of resource-constraints and lack of IT expertise.

There are concerns related to the privacy, security, ethics, health equity/cultural sensitivity and accessibility aspects of implementing this technology. We will need to address those concerns in order use this technology without exacerbating health inequities and in ways that are ethical and appropriately protect individuals' privacy and security. We have brought this to the attention of the responsible groups at DOH and are working on preliminary reviews (see appendixes).

• **R = Recommendation (action requested/recommended — what you want)**

   1)   Develop a Washington-specific iOS and Android User-Facing App in partnership with the University of Washington and Microsoft Research

The University of Washington is an ideal partner in this effort, having successfully developed two COVID-19 specific mobile applications, and as a state university. It is committed to an equity-minded, user-centered approach and will add the five to 10 most commonly spoken languages (Spanish, Russian, Vietnamese, Ukrainian, Somali, Arabic, Korean, Chinese (traditional), Tagalog & Punjabi). In order for UW to continue work and be approved/provided the Apple/Google Application Programming Interface (API) needed to integrate the technology, we need to send an endorsement letter to the UW (cc David Postman). We recommend DOH and the Governor's Office give this endorsement with the condition that the project proceed under close oversight and review, so that all relevant privacy, security, ethics, and health equity/cultural sensitivity concerns are addressed satisfactorily before wide-scale implementation. We suggest that we enlist UW School of Public Health (in partnership with community leaders and organizations) to act as a liaison to DOH during these parallel efforts to stand up traditional tracing, and to pilot this technology.

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[4] We should aim for top 10 languages at the very least and as language data becomes more available for cases, hospitalizations, deaths, etc., we should prioritize communities that are disproportionately impacted (for example, COFA or other PI communities that are typically lumped under the broad "Asian" category). This could be an incredible opportunity for UW to also directly partner with community leaders, build trust/relationship, and have them be involved in adapting/modifying the app to suit their communities' needs (as appropriate/feasible).

The UW is also willing, during the v2 pilot release, to work with disability partners to assess feasibility and adoption, particularly among visually-impaired/blind and deaf/hard of hearing community.

[5] PEW article https://www.pewresearch.org/internet/fact-sheet/mobile/

2)   Identify & Connect to a National Key Server Host

To temporarily store the Bluetooth message keys corresponding to users with positive test (ideally single server so it functions across neighboring regions). The Bluetooth exchanged hashed message keys have no identifiable information and this part holds no technical risk. National association leaders have agreed it is best for public adoption for it not to be a federal agency. The Association of Public Health Laboratories (APHL) who has agreed to host a national key server so that apps from all states will be interoperable using the approved Apple/Google API for Cryptographic Keys shared via Bluetooth between devices in proximity to each other. After 14 days, the message keys are deleted from both the phone and server, as they are no longer a concern.

3)   Determine & Implement Positive Test Verification Methodology

To enable app to verify validity of positive test.

We recommend we use the Washington Lab-confirmed Verification Server as a phone call assisted entry of the PIN for phase 1 and work with UW to create a validation PIN manual entry into the app. Case investigators would be able to instruct confirmed cases over the phone to enter this PIN into their app. Then, the app checks against the PIN Verification Server and provides a Token the user can choose to enter. Entering the token into their phone will release the message keys to a separate national Diagnosis Key Server (APHL). This prevents unauthorized triggering of proximity notifications and separates the verification process from the keys upload process. TBD if this PIN verification process is integrated into CREST ARIAS Scope or is a stand-alone system.

4)   Define Meaningful Exposure

We recommend we work with CSTE PHII and a team of epidemiologist (maybe Jasmine M. DOH and Atar Baer King Co. as local leads) to come up with initial determination of sensitivity settings of which exposures warrant a notification. Four adjustable "dials" could be set to something like:

       1) Duration e.g >**10 min (now 15)**;

       2) distance e.g. < **6** feet Proximity or signal Attenuation;

       3) Time since exposure e.g. **<2** days; and

       4) Infectivity adjustment (tbd)

If those settings produce too many contacts to call, they can be adjusted. We will also need to adjust based on field testing for what the performance is around walls partitions etc.

5)   Define Next Steps for Contacts DOH and LHJ investigation

Recommend developing an LHJ workgroup [unknown number of LHJs interested in the technology] to define processes and protocols associated with follow-up of contacts identified via this method. Including thinking through recommendations the app could give to self quarantine, get tested, contact public health and monitor symptoms. This group could also participate in the national effort to standardize Case Investigation and Contact Tracing requirements and exchange standards between jurisdictions.

6)   Integrate with workflow and CRM solution, workflow integration (e.g. Microsoft ARIAS or RedCap)

The Microsoft ARIAS (CREST) or Redcap workflow would need to add a question on the Case Investigation interview, "Have you installed the app?" If YES, give them a PIN so that, with their permission, people who were in close proximity can be anonymously notified. ARIAS Portal or phone pool

help line would accept incoming calls, text or secure messages from app users self-reporting that they may have been exposed to the Contact Tracing pool.

7)   Ownership, Branding and Launch a Public Awareness Campaign

To maximize broad public participation, including from communities disproportionately impacted, we need to determine if multi-jurisdiction branding or statewide branding is more effective or desired. We recommend working with Communications and Community Engagement Task Force to build onto the existing public awareness campaign and community outreach contracts, for traditional contact tracing that should address identified public privacy issues. Messaging needs to include facts like: "this 'data' (not really data) that will be stored in a national database can in no way be re-identified and is 'random gibberish'." We need to carefully think about what needs to be communicated now, during the pilot, and how a public awareness campaign would need to be customized for community preferences and norms, if the app is used in a larger area. Articles and social media misinformation campaigns about use of this data against people need to be addressed/countered. We suggest that to address some of these valid concerns, we may want to pilot in specific Latinx communities (as a starting point) to ensure there are not social or language barriers introduced. We may consider a second pilot test location in a jurisdiction such as Yakima to assess community perceptions and adoption rate among rural, food processing, and farm worker populations. Lastly, to address access issues due to cost-barriers, we suggest working with the Health Care Authority to determine if donated Apple iPhones and Android could be provided to Medicaid clients.

8) Form an Oversight Committee to Inform the Implementation

To appropriately address concerns related to the adoption of this new technology, we recommend forming an oversight group to monitor and inform development and implementation in Washington. This group should consist of at least the following: (see updated list in CHARTER approved 6.15.2020)
1. Oversight Committee Chair, UW SPH Associate Dean for Public Health Practice
2. DOH Privacy Officer
3. DOH IT Security Officer
4. Washington State Chief Information Security Officer (WaTech OCS)
5. Washington State Chief Privacy Officer (WaTech OPDP)
6. DOH Community Relations and Equity Director (or delegate to a CETF team member)
7. DOH Public Health/Medical Ethicist or external Ethics review as needed
8. DOH Investigations Team Representative
9. Local Health Jurisdiction representatives
10. Representative from Urban Indian Health Institute, Informatics and Epidemiology
11. Representative from Yakima Valley Farmworkers Clinic or LatinX community
12. Multiple representatives from Community Health Board Coalition who represents 14 unique and diverse communities
13. Representative from Alliance of People with disAbilities
14. Representative from the Governor's Office
15. Representative from Attorney General's Office
16. Representative from American Civil Liberties Union (ACLU), Technology and Liberty Project

Once formed, the group will organize and diagram the oversight group, ethics committee and accountable parties with roles and responsibilities indicated in a charter.

References:

UW White Paper https://arxiv.org/abs/2004.03544

 https://www.apple.com/covid19/contacttracing

https://register.apple.com/covid-19/faq.html

https://covid19-static.cdn-apple.com/applications/covid19/current/static/contact-tracing/pdf/ExposureNotification-FAQv1.0.pdf

PEW article https://www.pewresearch.org/internet/fact-sheet/mobile/

www.medrxiv.org/content/10.1101/2020.05.05.20091587v1

www.medrxiv.org/content/10.1101/2020.05.09.20096289v1